

## Comment to: Epidemiology of Primary Amebic Meningoencephalitis-related Deaths due to *Naegleria fowleri* Infections from Freshwater in Pakistan: An Analysis of 8-year Dataset

Dear Editor,

It was a great effort by the authors that will urge researchers to investigate the factors involved in the occurrence of primary amebic meningoencephalitis (PAM) from different dimensions. We ought to take this public health issue on broader context instead of focusing merely on chlorination and ablution. Although authors also mentioned some other possible factors but an emphasis was mostly on the levels of chlorine and ablution. A study conducted in Australia demonstrated for the first time that drinking water pipes are the source of *Naegleria fowleri* infection. This study found that *N. fowleri* can persist in a field drinking water distribution biofilm and exerts resistance despite chlorination. The presence of *N. fowleri* in biofilms of drinking water pipes needs thirty times the standard chlorine dose to kill this thermophilic organism.<sup>[1]</sup> Another study recommended the physical removal of these free-living amebae from the drinking water distribution systems which act as a reservoir for human pathogens.<sup>[2]</sup> We need to conduct studies, especially in Karachi on biofilms of water pipelines that may provide valuable findings in future. A recently published study also highlighted the common practice of the residents of Karachi to store water in overhead tanks which is then utilized on a daily need basis, and during extreme hot weather, it promotes an excystation of free-living ameba into its pathogenic form.<sup>[3]</sup>

Thermal pollution of water owing to power plants and industrial manufacturers also plays a vital role in the growth of ameba and its food source.<sup>[4]</sup> Ironically, PAM usually affects individuals having strong immune system unlike granulomatous amebic encephalitis and other diseases that affect immunocompromised individuals. The finding of overrepresentation of males is consistent with an epidemiological study of 46 years conducted in the USA.<sup>[5]</sup> The low mortality rate in females reported by this study most probably due to a reason of having weak immune system. However, Karachi is a metropolitan city of 24 million population and the majority of Muslims utilizing the same water being supplied by Karachi Water and Sewerage Board for ablution and other domestic purposes. A study conducted in Florida also demonstrated a widespread of *N. fowleri* that came into contact of more than 1 billion people, but only seven PAM cases were reported during 14 years. There might be several other factors responsible for causing infections in humans.<sup>[6]</sup> Therefore, improper chlorination

cannot be considered as a prime factor behind PAM reported cases, and there is a need to conduct future studies that can establish a link between risk factors and outcome.

Internationally, published literature mostly focusing the role of aquatic activities that leads to PAM while positive PAM cases in Pakistan are not consistent with these findings and need to be explored further in detail. Researchers have not yet achieved any success pertinent to specific treatment for PAM, whereas *N. fowleri* is also considered as a neglected ameba that may pose serious threats to the humans in future. Doctors should take complete medical history of all reported cases, especially related to the diseases of the upper respiratory tract illnesses which are considered as a possible reason of having PAM after the inhalation of *N. fowleri* contaminated water.<sup>[7]</sup>

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### Conflicts of interest

There are no conflicts of interest.

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